

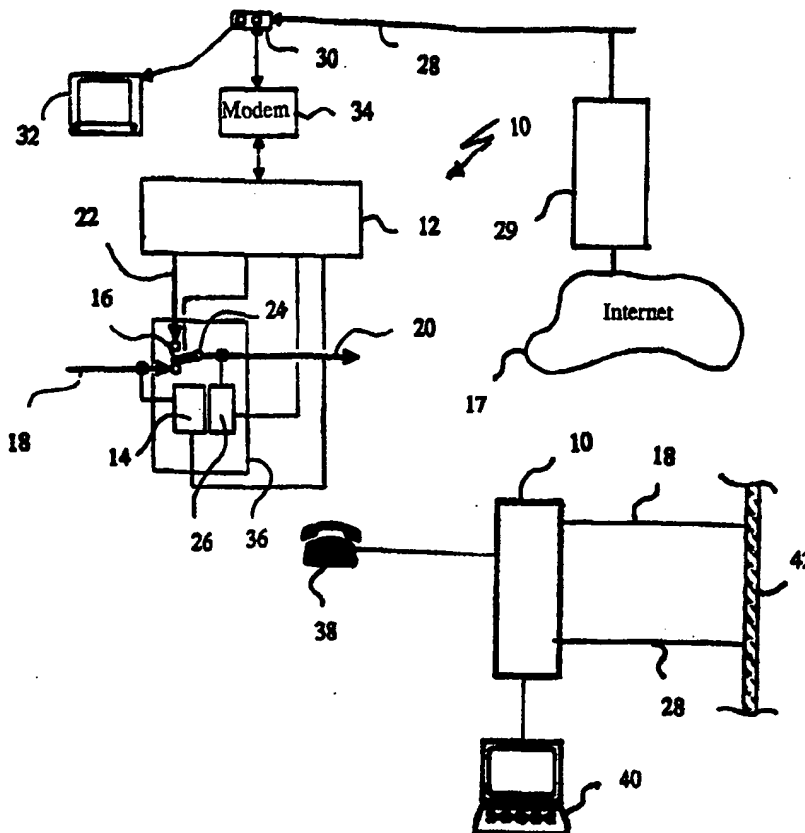


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/SE98/02035  <b>(22) International Filing Date:</b> 11 November 1998 (11.11.98)  <b>(30) Priority Data:</b> 9704140-4 11 November 1997 (11.11.97) SE  <b>(71)(72) Applicants and Inventors:</b> TEGENFALK, Stefan [SE/SE]; Wahlbergsgatan 12, S-121 38 Johanneshov (SE). LINDGREN, Bo [SE/SE]; Björknäsvägen 12, S-151 37 Södertälje (SE).  <b>(74) Agents:</b> HINZ, Udo et al.; AB Stockholms Patentbyrå AB, Zacco & Bruhn (publ), P.O. Box 23101, S-104 35 Stockholm (SE).		<b>(81) Designated States:</b> AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>In English translation (filed in Swedish).          Without international search report and to be republished upon receipt of that report.</i>

**(54) Title:** TELEPHONE NETWORK INTERFACE**(57) Abstract**

The invention concerns an automated method and an arrangement (10) for Internet telecommunication, whereby a broadband connection (28, 40) is permanently coupled to an Internet server (29). Speech to and from the Internet (17) is compressed or decompressed respectively in or out of the TCP/IP data package and is distinguished from other data via a specific bit signature.



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## **Title**

Telephone network interface

## **Technical field**

The present invention refers to a method and an arrangement for automatic Internet  
5 telecommunication via broadband connections that include channels for the said  
telecommunication.

## **The prior art**

Conventional telecommunication makes use of telecommunication networks  
provided by a telecommunications operator. These networks are preferably built up of cables that  
10 include copper conductors.

Transmission of broad frequency bands with high frequencies uses, for example,  
coaxial cables, fibre optic wave conductors, etc., but even copper conductors with techniques  
such as ADSL and VDSL.

The costs for making calls by conventional telecommunication increase quickly,  
15 with different rates for local, national and long-distance calls. Cost increases have been more  
noticeable now that many state-owned telecommunication monopolies have been deregulated as  
many of these were to a certain extent subsidised by the state. Telecommunication operators now  
operate under essentially the same conditions as other private companies with demands for a  
certain level of profitability.

20 In this respect, a new medium for transmitting telephone calls has opened up in the  
form of Internet telecommunication via broadband transmissions such as computer networks,  
cable TV networks and similar. However, making telephone calls over Internet today is a time-  
consuming method. As an example of the time-consuming nature of the method that precedes a  
telephone call via Internet, the parties that are to speak with one another must first call one  
25 another to arrange a time for the call to take place so that the equipment to be used for the call is  
set up for this purpose.

The international PCT document WO 97/20424 shows how a subscriber is alerted,  
via the public telephone network, that an Internet call awaits them via a central "Internet Access  
Service", whereby the subscriber can request to have the call connected in that the subscriber  
30 disconnects their Internet connection to be able to receive the call on their telephone.

Document WO 97/27692 even shows how Internet telecommunication is transmitted over the public telephone network, whereby the call is administered from a central unit that connects many subscribers.

In addition, a method for Internet telecommunication is described in document WO 97/22212. Its task is to simplify the integration of public telecommunication (PSTN, Public Switched Telephone Network) and WWW (World Wide Web), which is a client-server application using the protocol HTTP (Hyper Text Transfer Protocol), which is optimised for use over the Internet. The document specifies a service resource item that is associated with a specific telephone number for requesting the service. The service can, for example, be Internet telecommunication over the public network.

One objective of the present invention is to specify a method and a means for telecommunication over the Internet that allows individual use of public telecommunication (PSTN), Internet telecommunication and data telecommunication with constant access to Internet telecommunication without having to request the service from, for example, a central unit external to the subscriber or a home page for Internet telecommunication.

The present invention concerns a method and a means for constant access to Internet telecommunication according to the characteristics in the enclosed independent claims.

In addition, the dependent claims specify preferred embodiments of the invention.

#### **Summary of the invention**

The present invention concerns a method for automated Internet telecommunication via broadband connections. An operator of broadband connections provides a permanently connected connection to the Internet service of the operator for every subscriber. In this way, every connected subscriber always has a unique permanent or dynamic IP-address in the server, which means that other Internet users can, via the server and in real time, identify the IP number of the subscriber, whereby the call connection takes place in real time, which is achieved by an interface for controlling the Internet telecommunication and public telecommunication respectively with a connection for broadband connection for every subscriber as well as a switching function between these during calls (speech, data, etc.).

The interface for controlling and connecting via a modem the Internet telecommunication respectively public telecommunication to a broadband connection identifies a package of data with speech from Internet via a specific pre-determined signature where a decoder included in the interface transforms the contents of the package of data to audible sound,

and whereby a encoder transforms spoken sound to a package of data that transmits speech on the Internet.

Through different signatures for packages of data with speech and other data, the interface allows a computer that is connected to Internet via the interface to continue  
5 communication.

In one embodiment, the signature is a bit-signature.

In one embodiment of the method, a unique serial number can be assigned to every interface means, which is included in a memory in the means so that automatic login in the server takes place when the code for the Internet telecommunication mode is entered.

10 In addition, the present invention refers to an arrangement for automated Internet telecommunication via broadband transmission, whereby it includes the following means:

means for broadband transmission connected to a subscriber of Internet telecommunication;

server connected to the means for broadband transmission, whereby the subscriber  
15 is constantly connected to Internet via the permanent or dynamic IP-address of the subscriber that is always stored in the server;

interface means, including processing technology for steering the Internet and public telecommunication, connected between the telephone of the subscriber and to the means for broadband transmission via a modem, whereby the means handles the compression and  
20 decompression of packages of Internet data and distributes them to the intended units that are connected to the interface means; and

means for switching between Internet and public telecommunications connected to the interface, whereby the switching is controlled by the processing technology in the interface means.

25 The interface means for controlling the respective Internet telecommunications and public telecommunications, with modem connection to the means for broadband transmission, identifies a data package with speech from Internet via a specific, pre-determined signature where a decoder included in the interface transforms the contents of the data package to spoken sound, and whereby a coder transforms spoken sound to a package of data that transmits speech over the  
30 Internet.

In addition, the interface means can, via different signatures for packages of data with speech and other data, allow a computer that is connected to Internet via the interface means to continue communication while the Internet conversation is taking place.

In one embodiment of the invention, the signature is a bit-signature.

5 In one embodiment of the arrangement, a unique serial number can be assigned to every interface means. This unique serial number can be included in a memory in the means so that automatic login in the server takes place when the code for the Internet telecommunication mode is keyed in.

### **Brief description of the drawings**

10 The continued description refers to the enclosed drawings to provide a better understanding of the invention and of its embodiments, where:

**Fig. 1** illustrates a one embodiment of the present invention for Internet telecommunication.

**Fig. 2** illustrates schematically one embodiment of an interface to a PSTN, a  
15 broadband network and a computer according the present invention.

**Fig. 3** illustrates schematically an alternative embodiment of an interface according to fig. 2.

### **Detailed description of preferred embodiments**

A detailed description of a method and preferred embodiments of an arrangement  
20 for "automated" Internet telecommunication according to the present invention is given below with reference to the enclosed drawings.

In the description of the invention, Internet should be interpreted in its widest sense, i.e. to include all types of current and future networks for similar communication. Automated Internet telecommunication in this context means that the interface that the invention has with the  
25 PSTN and the broadband network allows telecommunication via Internet and the PSTN in a known manner without subscribers having to take any other measures apart from, for example, pressing keys and recognising different ringing tones from their permanently connected telephones or from remote telephones with a permanent base station. The subscriber dials or answers in the conventional way without actually having to bother about which network is being  
30 used.

The invention is built around each subscriber who uses the invention being permanently connected to, for example, the Internet server of a cable TV operator via the cable

TV network of the operator, or via a means of broadband transmission other than the cable TV network. Being permanently connected means a permanent Internet connection or constant access to the network. This means that every subscriber always has their own unique IP address (Internet Protocol address) in the server, which allows other users of Internet to uniquely in real time identify the IP number of the subscriber. As the IP number is always available in the server, subscribers of Internet telecommunication with their IP numbers can always be reached. The IP addresses can be dynamic, i.e. if the operator of the service has acquired 400 IP addresses but has 700 subscribers, the last three characters in the address can be assigned randomly to each subscriber.

10               When a WWW-server, for example, answers when a PPP (Point-to-Point Protocol) call is received, the server replies when the connection has been made to Internet with, for example, "your IP address is 123.12.123.123.128.119". The underlined number is dynamic and is equivalent to a port or a channel in the server computer. If the permanent IP address of the subscriber is, for example, 234 and the subscriber has been assigned the dynamic address 119, it means that the server must have, for example, a look-up table that tells the server how contact with the individual subscriber is established. In the case of a dynamic address, the subscribers must thus have their identity readable from the WWW-server. This is facilitated by there being a connection between the login, password and identity.

              The present invention does not only assume a cable TV network for Internet telecommunication. Other possible networks are remote, electrical power networks, 20 telecommunication networks (ISDN, Integrated Services Digital Network) with broadband techniques such as ADSL (Asymmetric Digital Subscriber Line) and VDSL (very high data rate Subscriber Line). A modem for ADSL allows ordinary conversations over a PSTN at the same time as ADSL communication takes place with Internet. ADSL allows the possibility of high-speed transmissions over the ordinary telephone network. However, transmissions occur only 25 between one's own ADSL modem and the ADSL receiver at the closest switching station, where the data traffic is switched in to separate high speed networks that are built around ATM (Asynchronous Transfer Mode) or Ethernet® technologies.

              The ADSL modem comprises two parts, where one part accomplishes conventional 30 telecommunication via a splitter, which is a filter that separates speech from data communication. The other part takes care of the digital communication. A cable from the modem is connected to a computer via an ATM or an Ethernet® card.

Telecommunication over the Internet according to the present invention can, in one embodiment of the invention, be achieved by the TCP/IP (Transport Control Protocol/Internet Protocol) data packages that contain speech being marked with a specific characteristic that distinguishes them from pure packages of data that are detected in the interface or the interface means against the PSTN and, for example, the cable TV network, which steers a means for switching between PSTN telecommunication and Internet telecommunication to or from a telephone respectively. The characteristic can be a specific bit-signature or other distinguishing signature respectively marking in the TCP/IP data packages that are detected by the interface as a package containing speech that is decoded by the interface and transformed to analogue sound or voice signals, at the same time as the interface sends out the signal to the telephone. In the reverse situation when speech from a telephone is directed to Internet, the interface transforms the analogue speech to digital signals that are packaged in TCP/IP data packages and transmitted to the intended IP-address.

According to that above, the analogue sound is acquired from the flow of data packages that are sent via Internet or vice versa, whereby the analogue sound is transformed to a flow of data packages that are sent over Internet. It is preferable to use algorithms for mobile telecommunication, such as GSM, to obtain the best possible sound quality in as small amount of sound data as is possible in a package.

In one embodiment, the relatively complex IP-address can be provided with an alias, in other words, the IP-address can be related to a more user-friendly combination of character or number combinations, for example, telephone number 08-xx xx xx or a person's first name or surname. Achieving this is well known for a person skilled in the art and can be accomplished with look-up tables or similar.

Fig. 1 illustrates one embodiment of an arrangement 10 according to the present invention for Internet telecommunication. The arrangement 10 comprises a means 12 that constitutes the said interface (likely to be called e-Phone) that acts as a controlling means and a line control for telecommunication, for incoming PSTN telecommunication, broadband telecommunication and other data communication. For persons skilled in the art, the interface 12 includes known technology in the form of a processor for controlling incoming and outgoing traffic with a A/D transformer and D/A transformer respectively, coders for coding and decoding speech, memory units plus software for compressing and decompressing speech, etc. Although individual units that are included in the arrangement 10 and their functions are known for persons



skilled in the art, the present invention shows a hitherto unknown and innovative method for direct access to Internet telecommunication and an arrangement for carrying out the method.

A more concrete idea of what the arrangement 10 can include is given below:

- 5           - 486-based processor technology, i.e. standard PC components.
- 8 Mbytes DRAM
- CODEC (coder/decoder) with suitable coding algorithms (e.g. GSM).
- Line interface to, e.g. a cable TV modem.
- Interface to line relays, line hold, tone detector, etc.
- 10          - Interface to a PC connected to Internet, RS-232C or USB series interface.
- Software in the form of assemblers for time-critical applications plus high-level language, for example, such as C++ or similar to create a good software environment.
- Power supply in the form of outside net eliminators.

15

A dialling tone detector 14 senses if a call is coming from the PSTN network, in which case the signal is forwarded as an incoming signal to interface 12, whereby the line control sets a relay switch 16 in position to receive a call from the permanent telephone network PSTN 18. The dialling tone detector 14 can also include a means (not shown) for delivering the holding  
20          current back to a telephone exchange (not shown). Such a means is used to retain the line when switching takes place between the Internet telecommunication and conventional telecommunication. The transformer or relay switch 16 has the NC-contact connected 20 to the permanent telephone and the No-contact is connected 22 to the interface means 12. The relay switch 16 is controlled from the interface means 12 via line control (PSTN or Internet 17). The  
25          common relay contact COM 24 is connected to the permanent telephone apparatus, which means that several telephones with contact breaking functions can be connected after one another.

On the COM side of the relay function 16, there is a DTMF detector ( Dual Tone Multiple Frequency detector) 26 connected for detecting telephone number tones, i.e. for detecting outgoing calls to the PSTN 18 or cable TV network 28 including Internet  
30          telecommunication channels that are constantly open for communication with the Internet server 29 of the operator. The reference designation 30 indicates a connection box with connections for

TV 32 and telecommunication. Telecommunication and data traffic between Internet 17 and the interface means 12 takes place via a modem 34.

It is implied that the arrangement 10 can be integrated into a unit as this is preferable and that the communication to and/or from the arrangement can be achieved by remote means.

The DTMF detector in the switching means 36 is used to identify character and/or number series, for example, one to three inclusive individually selectable characters, e.g. \*#1, etc. Different types of modern telephone exchanges, e.g. the AXE exchange system that have different degrees of development, can have used character combinations that are not conventionally known for a broader public, which is why such character combinations should be avoided. The said combination \*#1 tells the arrangement 10 that the call in question is an Internet call, whereby the relay switch 16 directly connects the permanent telephone to the Internet 17. The programming of such a special code in arrangement 10 can take place via the use of the key set of the telephone according to a pre-determined specific method.

When a subscriber A connects their telephone in the Internet call mode with, for example \*#1, they can key in a shorter number, for example 08-xx xx xx, the subscriber number of B in the permanent telephone network, instead of keying in the IP address that identifies the receiver B. Software in the interface can then transform 08-xx xx xx to IP 13y.31y.54y.012 (here, x and y indicate numbers). This is based on a register for linking together subscriber numbers with IP addresses in the servers 29.

The interface means 12 can be assigned a unique number series (PIN-code, Personal Identity Code) that can be used as substitutes for passwords that the operator of server 29 and the network 28, 42 have obtained and that are included in a memory in means 12 so that automatic login takes place in server 29 when the code for the Internet telephone mode (\*#1) is keyed in.

If a call is received via the permanent telephone network PSTN 18 while calling via the Internet telephone mode, a short tone, for example, is given via the calling tone detector 14 to alert the user of the telephone that a call is coming in on the permanent PSTN line 18. The user of means 10 then uses the key pad of the telephone and keys in a pre-determined character code that switches over the line relay or switching relay 16 to the permanent telephone. The user answers and, if desires, can switch back and forth between the permanent line 18 and the Internet line 28 by using a specific numerical switching code. If the user wants to end the call on the permanent line 18 they can, for example, press down the telephone handset rest button as normal

when a new tone will be heard, whereby the specific character code for Internet telecommunication is keyed in and the user is returned to the Internet telephone mode. This also applies in reverse, i.e. switching to the Internet mode from the permanent line 18. The said functions do not necessarily differ from the method for switching between two incoming calls in a conventional modern telephone exchange. The functions normally found in an AXE telephone exchange, for example, can all be used when the telephone is in the permanent line mode, i.e. not in Internet telephone mode.

Fig. 2 illustrates very schematically one embodiment of an interface to PSTN, a broadband network and a computer according to the present invention. The means 10 has an interface to the PSTN network 18 and to Internet 17. Cabling 42 refers in general to one or more networks.

In addition, a PC 40 is connected with a serial RS-232C or USB outlet. Via software, the means 10 allows the PC 40 access to possible TCP/IP data packages that are exchanged on common Internet traffic at the same time as Internet telecommunication is taking place. This is possible due to the special marking that the data packages receive according to that stated above.

In addition, fig. 3 illustrates very schematically an alternative embodiment of an interface according to fig. 2. Here the cabling 24 shows standard telecommunication where data are separated from standard telecommunication with broadband technology. Note here that conversation via Internet 17 is transmitted in data packages. They nevertheless have a specific bit signature so that packages of speech can be differentiated from other data.

The present invention has been described in the form of preferred embodiments, but is nevertheless not limited to these but to the wording of the enclosed claims that define the invention for a person skilled in the area of the technology.

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### Claims

1. A method for automated public and Internet telecommunication via broadband connections (28,42), characterized in that an operator of broadband connections provides a permanently coupled connection to the Internet server of the operator via an interface (12) for  
5 controlling Internet telecommunication (28) and public telecommunication (18) respectively with connections (34) to broadband connections (28,42) for every subscriber (38) as well as switching between these during calls from the respective telecommunication, whereby every connected subscriber (38) always has a unique IP-address in the server (29), which means that other Internet users can, via the server (29), identify in real time the IP number of the subscriber, whereby a  
10 call connection takes place in real time.

2. A method according to claim 1, characterized in that the connection of the interface is a modem connection (34) to the broadband connection (28,42) which identifies a data package with speech from Internet (17) via a specific predetermined signature where a decoder included in the interface transforms the contents of the data package to audible sound, and whereby  
15 a coder transforms spoken sound to data packages that transmit speech on the Internet (17).

3. A method according to claim 2, characterized in that the interface, via different signatures for data packages with speech and other data, allows a computer (40) that is connected to Internet (17) to continue communicating.

4. A method according to claims 1-3, characterized in that the signature is a bit  
20 signature.

5. A method according to claims 1-4, characterized in that a unique serial number is assigned to every interface means (12) and included in the memory of the means (12) so that automatic login in the server (29) takes place when the code for the Internet telecommunication mode is keyed in.

25 6. An arrangement (10) for automated Internet telecommunication via broadband connections (28,42), characterized in that it includes the following means.

means for broadband transmission (28, 42) connected to a subscriber (38) of Internet telecommunication;

server (29) connected to the means for broadband transmission (28, 42), whereby  
30 the subscriber (38) is constantly connected to Internet (17) and identifiable via the IP-address of the subscriber that is always stored in the server (29);

interface means (12) , including processing technology for steering the Internet and public telecommunication, connected between the telephone apparatus (38) of the subscriber and

the means for broadband transmission (28, 42) via a modem (34), whereby the means (12) handles the compression and decompression of packages of Internet data and distributes them to the intended units (38, 40) that are connected to the interface means (12); and

means (36) for switching between Internet and public telecommunications connected to the interface, whereby the switching is controlled by the processing technology in the interface means.

7. An arrangement (10) according to claim 6, characterized in that the interface (12) for controlling the Internet telecommunication respectively public telecommunication with a modem connection (34) to the means (28, 40) for broadband transmission identifies a package of data with speech from Internet (17) via a specific pre-determined signature where a decoder included in the interface (12) transforms the contents of the package of data to audible sound, and whereby a coder transforms spoken sound to a package of data that transmits speech on the Internet (17).

8. An arrangement according to claim 7, characterized in that the interface (12), through different signatures for packages of data with speech and other data, allows a computer (40) that is connected to Internet (17) via the interface (12) to continue communicating during the current Internet call.

9. An arrangement according to claims 6-8, characterized in that the signature is a bit-signature.

10. An arrangement according to claims 6-9, characterized in that a unique serial number is assigned to every interface (12) and is included in a memory in a means (12) so that automatic login in the server (29) takes place when the code for the Internet telecommunication mode is keyed in.

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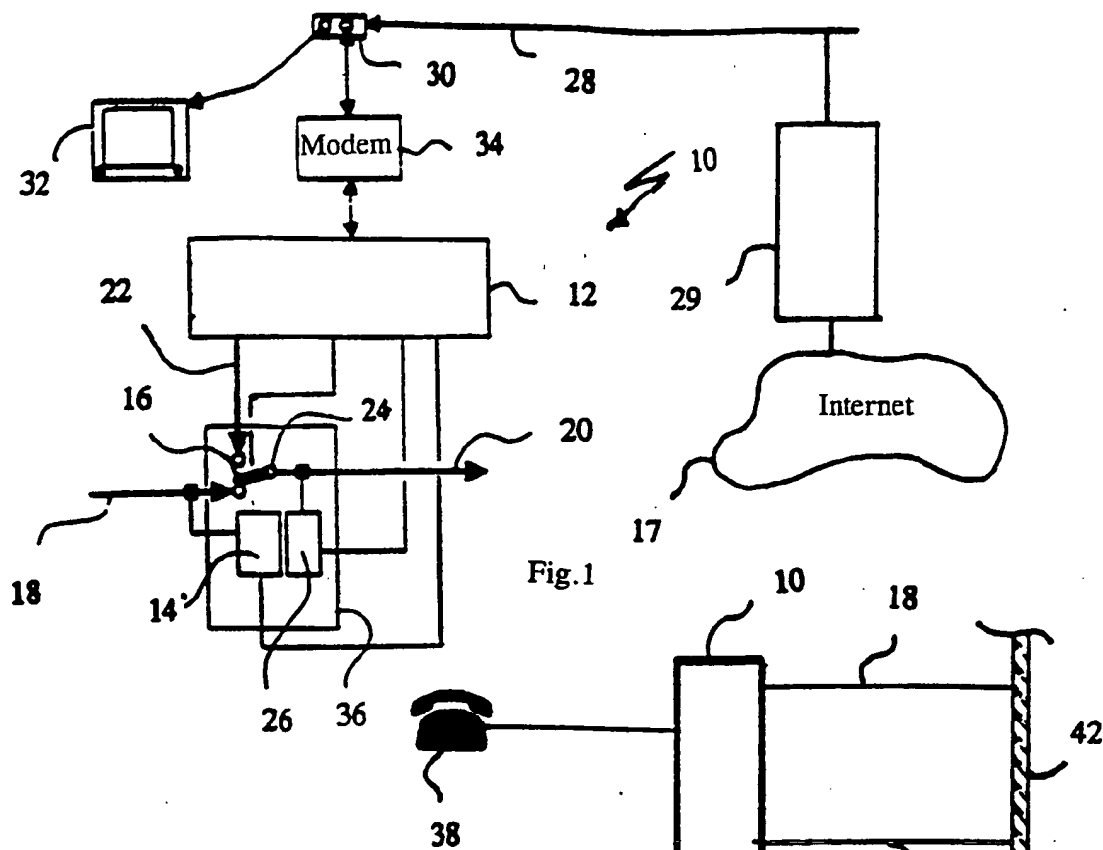


Fig. 2

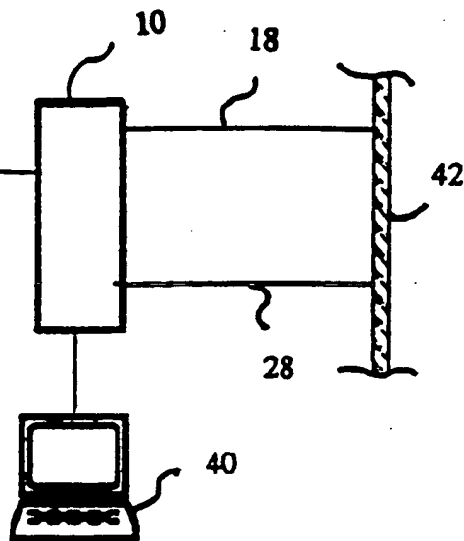


Fig. 3

